3.2.4 AFCEE Requirements for Selecting Chemicals of Potential Concern in Human Health and Ecological Risk Assessments

August 2003

Introduction

A site contaminant is a chemical present at elevated concentrations in a medium because of release attributable to site activities. A chemical of potential concern (COPC) is a contaminant selected for further evaluation in a human health or ecological risk assessment because it may threaten human health or the environment. A COPC selected for further evaluation in an ecological risk assessment may also be called a chemical of potential ecological concern. The credibility of a risk assessment depends, in part, on selecting and determining the concentrations (and sometimes the chemical forms) of the COPCs evaluated in the risk assessment.

AFCEE Requirements

The selection of COPCs will be based on selection criteria delineated in the work plan (WP) that governs the risk assessment. The selection criteria will be supported by data quality objectives (DQOs) and sufficiently detailed in the WP to ensure that all selected COPCs are (1) likely attributable to activities at the site and (2) present at sufficient concentrations or have other characteristics that warrant evaluation in a risk assessment (U.S. EPA, 1989; 1992a; 2002).

Selection criteria will ensure that all selected COPCs are likely attributable to site activities, including one or more of the following:

- Positively detected in at least one sample from the site and associated with the site based on historical information
- Tentatively identified and either associated with the site based on historical information or confirmed by special analytical methods
- Transformation products of chemicals likely to be present as a result of site activities

Selection criteria will also ensure that all selected COPCs are present at sufficient concentrations or exhibit other characteristics that warrant evaluation as a COPC, including one or more of the following:

- Present at concentrations greater than those found in associated blanks
- Present at concentrations sufficiently greater than naturally occurring background concentrations
- Present at a concentration greater than human health or ecological risk-based screening concentrations
- Likely to migrate from one medium to another to threaten human health or the environment
- Likely to bioaccumulate or otherwise persist in the environment

Typically, the COPCs selected for a human health risk assessment will differ from those selected for the ecological risk assessment for a site. These differences will usually warrant separate but coordinated efforts to select COPCs for human health and ecological risk assessments (U.S. EPA, 1992b; 1997). The criteria and DQOs used to select COPCs will be developed independently for human and ecological receptors.

Additional criteria for selecting COPCs or reducing the list of COPCs may be developed based on state and local regulatory requirements, professional judgment, and stakeholder involvement. Additional criteria will be based on DQOs and sufficiently detailed in the WP to ensure that all chemicals attributable to site activities and potentially posing unacceptable risks to human health or the environment will be selected as COPCs to be included in the appropriate human health or ecological risk assessment.

The COPC selection process will be approved by the risk managers during review of the WP and sampling and analysis plan (SAP) for human health risk assessments and during problem formation and planning for ecological risk assessments. The information and rationale used to select the COPCs in a human health or ecological risk assessment will be summarized in the report(s) that present the risk assessments and their results. This summary will include a table modeled after Standard Table 2 (*Occurrence, Distribution and Selection of Chemicals of Potential Concern*) in Appendix A of RAGS Part D (U.S. EPA, 2001).

Recommended Practices and Guidance

Additional criteria for selecting COPCs or reducing the list of COPCs may be based, for example, on grouping chemicals by class or mechanism of toxicity or evaluating detection frequencies in either a human health or ecological risk assessment. Addition or elimination of chemicals from the list of COPCs could also be based on evaluating the chemicals as essential nutrients in a human health risk assessment or the likely significance of specific exposure routes for selected chemicals in an ecological risk assessment (U.S. EPA, 1989; 1997). A WP that includes such optional selection or elimination criteria should also clearly show that the time and effort required to develop, implement, and defend these criteria will likely facilitate, rather than delay, the completion of the risk assessment.

Whenever additional site characterization information is developed, the chemical information should be evaluated to determine whether chemicals should be added to or removed from the list of COPCs based on the criteria developed in the approved WP. For example, the concentration of the chemical may be higher than originally reported, degradation products of the chemical may be found at potentially toxic concentrations at the site, the method detection limit (MDL) or sample quantitation limits (SQLs) or sample reporting limits (SRLs) may be greater than risk-based screening values, or the chemical belongs to a class for which other members of the class were selected as COPCs. A report that presents the risk assessment and its results should also clearly identify such COPCs and explain why they were ultimately selected for further evaluation in the risk assessment.

References

U.S. EPA. 1989. *Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual, Part A, Baseline Risk Assessment (Interim Final).* U.S. Environmental Protection Agency: EPA/540/1-89/002.

U.S. EPA. 1992a. *Guidelines for Exposure Assessment*. U.S. Environmental Protection Agency: Federal Register 57: 22887-22938.

U.S. EPA. 1992b. *Guidance for Data Usability in Risk Assessment (Part A), Final.* U.S. Environmental Protection Agency: 9285.7-09A.

U.S. EPA. 1997. *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final.* U.S. Environmental Protection Agency: EPA/540/R-97/006.

U.S. EPA. 2001. *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments)*. U.S. Environmental Protection Agency: Pub. 9285.7-47.

U.S. EPA. 2002. *Draft Guidance for Evaluating the Vapor Intrusion to Indoor air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance).*